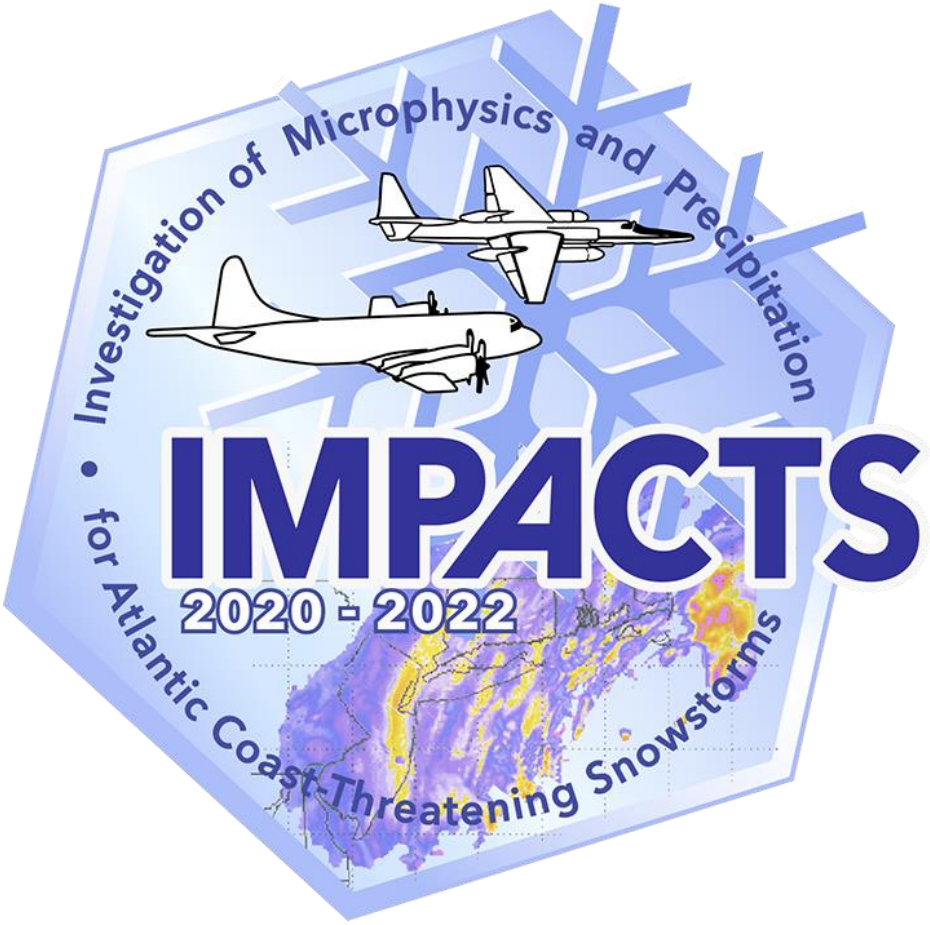
Investigation of Microphysics and Precipitation for Atlantic Coast-Threatening Snowstorms



IMPACTS Operations, Health and Safety Plan

Revision History			
Rev.	Description of Change	Author(s)	Effective Date
-	Initial Release	V. Salazar, K. Stern	09/22/2020
1	Made changes to Sections 2.4, 3.2.4, 3.2.4.2, 3.2.6.1, 3.2.6.2, 3.3.3, 3.4.1.1, 3.10.1. Added text to Sections 2.1, 3.1.1, 3.2.4.4, 3.3.5 and Appendix G	V. Salazar, K. Stern	09/28/2020
2	Made changes to Table 2 and Sections 2.1 and 2.4	V. Salazar, K. Stern	09/29/2020
3	Made changes to Section 2.1, Removed Section 2.4	V. Salazar, K. Stern	09/30/2020

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1. IMPACTS Project Overview

The Investigation of Microphysics and Precipitation for Atlantic Coast-Threatening Snowstorms (IMPACTS) is one of five investigations that make up NASA's Earth Venture Suborbital-3 (EVS-3) program. This five-year program is funded by and under the direction of the Science Mission Directorate's Earth Science Division (ESD) at NASA Headquarters.

Though essential to the mission: for the purpose of this plan, the operational objectives of IMPACTS are to fly a complementary suite of remote sensing and in-situ instruments between January and February 2021, using the ER-2 and P-3 aircraft. The science project objectives are to provide observations critical to understanding the mechanisms of snowband formation, organization, and evolution. IMPACTS will also examine how the microphysical characteristics and likely growth mechanisms of snow particles vary across snowbands. IMPACTS will improve snowfall remote sensing interpretation and modeling to significantly advance predictive capabilities.

The IMPACTS project is managed by personnel from the NASA Ames Earth Science Project Office (ESPO). Therefore, the IMPACTS Operations, Health and Safety Plan for the field campaign at Dobbins ARB is an ARC responsibility and includes the COVID-19 protocols and mitigations for that location. The field deployment efforts at Wallops will be governed by the Wallops Return to Onsite Work (RTOW) Plan. The work to support the IMPACTS deployment in 2020/21 involves several NASA Centers and Universities. The scope of this document will apply to all IMPACTS participants. RTOW Plans from the various institutions, universities and NASA Centers will be provided (as they become available). Universities and/or institutions not developing a RTOW plan will adhere to the rules and regulations stated in this plan.

This document builds upon the lessons learned from the ARC approved S-MODE RTOW plan.

The NASA centers and universities whose employees are supporting IMPACTS by traveling and physically working on site at a NASA facility or elsewhere, are described in Table 1. The IMPACTS airborne instrument suite (as shown in Appendix A) provides a synergistic range of measurements for snow process studies. It combines advanced radar, lidar, and microwave radiometer remote sensing instruments on the ER-2 with state-of-the-art microphysics probes and dropsonde capabilities on the P-3 to sample US East Coast winter storms.

Table 1: IMPACTS Campaign Participants and Roles

Institution	Acronym	Role	Deployment Location	Lead (POC)
NASA ARC	ARC	Project Management	NASA WFF Dobbins ARB	Vidal Salazar
NASA AFRC	AFRC	ER-2 Aircraft	NASA AFRC Dobbins ARB	Brian Hobbs
NASA GSFC	GSFC	P-3 Instrumentation	NASA WFF NASA AFRC Dobbins ARB	Gerry Heymsfield

NASA LaRC	LaRC	ER-2 Instrumentation	NASA AFRC Dobbins ARB	Luke Ziemba
NASA Marshall	Marshall	ER-2 Instrumentation	NASA AFRC Dobbins ARB	Tim Lang
NASA WFF	WFF	P-3 Aircraft	NASA WFF	Mike Cropper
Multiple Universities	N/A	P-3 Instrumentation	NASA WFF	Lynn McMurdie

1.1. Criticality of Investigation

On August 06, 2020, the NASA HQ Science Mission Directorate's Earth Science Division issued a letter classifying IMPACTS as a Major Impact project (Appendix I: References [1]). This letter stated the importance of the continuation of planning for the January/Feb 2021 IMPACTS deployment.

In addition, on September 10 at the NASA SMD Town Hall (Appendix I: References [2]), Karen St. Germain announced Airborne Science projects were in 'return to work' status. Ames Center Deputy Director confirmed this designation (see email exchange, Appendix I: References [3]). With this support, this IMPACTS Operations and Health Safety Plan was created under the following purpose and scope:

2. Purpose and Scope

The purpose of this document is to describe the IMPACTS-wide plan to mitigate the transmission risk of COVID-19 to and from personnel supporting IMPACTS airborne operations. IMPACTS management has already reduced the COVID-19 risk by limiting the number of personnel in the field. There will be no more than 36 individuals [out of more than 50 that would normally participate] --including management, mission scientists, scientists, and air crew--at each field site at a given time. Table 2 shows the maximum number of people working on site for each one of the four project phases as defined by the scope of this document (Section 2.1) and the maximum number of participants from ARC (ESPO), aircraft instrument teams, science support and the aircraft support crew.

Table 2. Maximum number of IMPACTS team members at each location at a given time.

NASA ARC				
Participants	**Preparation**	**Integration**	**Deployment**	**Deintegration**
ARC (ESPO)*	2	0	0	2
Totals	2	0	0	2
NASA Wallops				
Participants	**Preparation**	**Integration**	**Deployment**	**Deintegration**
ARC (ESPO)*	0	1	1	1

Science Team	0	7	12	5
P-3 Crew	23	23	23	23
Totals	23	31	36	29
NASA AFRC				
Participants	**Preparation**	**Integration**	**Deployment**	**Deintegration**
ARC (ESPO)*	0	1	0	1
Science Team	0	6	0	5
ER-2 Crew	12	12	0	12
Totals	12	19	0	18
Dobbins ARB				
Participants	**Preparation**	**Integration**	**Deployment**	**Deintegration**
ARC (ESPO)*	0	0	1	0
Science Team	0	0	7	0
ER-2 Crew	0	0	12	0
Totals	0	0	20	0

* See Appendix F for ARC(ESPO) staffing plan and supporting roles

2.1 Mission Phases

IMPACTS operations are split into four distinct mission phases: preparation, integration, deployment, and deintegration. The *preparation phase* will take place at different NASA centers and universities. The *integration phase*, which will occur on site at NASA AFRC (for the ER-2) and NASA WFF (for the P-3), is nominally scheduled from November 9th - December 16th. The *deployment phase*, which will occur on site at NASA WFF (P-3) and Dobbins ARB (ER-2) is nominally scheduled from January 11 - February 28th. After the deployment phase, there will be a short *deintegration phase* at NASA AFRC and NASA WFF scheduled for the week of March 1st. A detailed mission schedule can be found at https://espo.nasa.gov/impacts/calendar/2021-01.

During any of the project phases, the RTOW plan that applies is described below. When doing work at a location away from Ames, Ames employees will comply with whichever COVID-19 safety rules are most restrictive.
When working at Ames, all personnel will comply with this plan, and non-Ames personnel may follow additional requirements of their home institution.

2.1.2 Preparation Phase

Project participants will prepare instruments and equipment to be deployed at either NASA WFF or Dobbins ARB to support the field phase of the IMPACTS campaign.

- **When: Now - November 16, 2020**
- **Where:** This activity will take place at instrument PIs home centers and institutions.
- **Who needs to participate:** NASA ARC, NASA GSFC, NASA WFF, NASA AFRC, NASA MSFC, and University Participants.
- **What RTOW plan applies:** Each Center/Organization/University will follow their own RTOW plan. This plan covers work occurring at NASA ARC during this period.

2.1.3 Integration Phase

Project participants will install, test, and calibrate instruments and equipment to be installed on the NASA ER-2 and NASA P-3 at NASA AFRC and NASA WFF respectively.

- **When: November 2, 2020 to December 16, 2020**
- **Where:** NASA AFRC (for the ER-2) and NASA WFF (for the P-3)
- **Who needs to participate:** NASA ARC, NASA AFRC, NASA GSFC, NASA MSFC, NASA LaRC and University Participants.
- **What RTOW plan applies:**
    - For those integrating on the ER-2, the NASA AFRC RTOW applies while working at NASA AFRC.
    - For those integrating on the P-3, the NASA WFF RTOW applies while working at NASA WFF.

2.1.4 Deployment Phase

NASA WFF will serve as the base of operations for all IMPACTS activities during the field deployment phase. NASA WFF also will be the base of operations for the NASA P-3. Dobbins ARB will be the base of operations for the NASA ER-2 aircraft.

- **When: January 11, 2021 to February 28, 2021**
- **Where: NASA WFF will be the host of the main IMPACTS Operations Center.**
    - NASA ER-2 will be based at Dobbins ARB.
    - NASA P-3 will be based at NASA WFF.
- **Who needs to participate:** NASA ARC, NASA AFRC, NASA GSFC, NASA Marshall, NASA LaRC and University Participants.
- **What RTOW plan applies:**
    - The IMPACTS WFF Operations Center will follow the WFF Center Safety Plans.
    - Operations at Dobbins ARB will follow this IMPACTS Operations Health and Safety Plan.

2.1.5 Deintegration Phase

Project participants will remove instruments from the project aircraft.

- **When: March 01, 2021 to March 15, 2021**

- **Where:** NASA AFRC (for the ER-2) and NASA WFF (for the P-3).
- **Who needs to participate:** NASA ARC, NASA AFRC, NASA GSFC, NASA Marshall, NASA LaRC and University Participants.
- **What RTOW plan applies:** As for integration, each center follows their own RTOW plan.
    - For those deintegrating on the ER-2, the NASA AFRC RTOW applies while working at NASA AFRC.
    - For those deintegrating on the P-3, the NASA WFF RTOW applies while working at NASA WFF.

2.2 Additional RTOW Plans

This document intends to cover overall IMPACTS COVID-19 mitigation strategies. The latest version of the individual RTOW plans developed by the participant centers and universities are being created in parallel and will be provided upon request. Furthermore, while the IMPACTS investigation is a cooperative effort among NASA ARC, AFRC, GSFC, LaRC, Marshall, WFF, and various universities, this document is limited to describing the NASA airborne operations and airborne support operations that will occur at NASA AFRC, NASA WFF, and Dobbins ARB. All RTOW plans mentioned here that are outside the scope of this document will be made available by the IMPACTS project manager by request when completed.

This plan is and will continue to be applicable to IMPACTS on-site mission operations during Stages 1-3 as defined by NASA's Framework for RTOW.

2.3 Travel Requests

ARC personnel will request travel to and from the following locations for IMPACTS activities:

- NASA WFF – P-3 Integration, Science Flights, and P-3 Deintegration
- NASA AFRC – ER-2 Integration, ER-2 Deintegration
- Dobbins Air Reserve Base – Site Survey and ER-2 Deployment

Travel specific plans (dates, locations and overall schedules) for ARC employees (ESPO) are described in Appendix F.

3. COVID-19 Protocols and Mitigations

3.1. Health Monitoring

3.1.1. P-3 Consideration: Approval to fly on the NASA P-3 requires medical clearance from NASA Wallops through the Johnson Space Center (JSC) Qualified Non-Crew Member (QNC) Flight Medical Clearance database. No ARC personnel will be flying on the P-3.

3.1.2. ER-2 Consideration: The NASA ER-2 is a single seat research aircraft that does not allow for instrument scientists to fly. Access to the aircraft is restricted to the pilot in command, and he/she follows AFRC RTOW rules and regulations.

3.1.3. All mission personnel (including designated alternates) who plan to travel to support IMPACTS for any of the four distinct phases, and who fall into any one of the health risk categories listed at https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/groups-at-higher-risk.html will be discouraged from traveling. If any individual in this category still chooses to participate, it will be recommended to them that they consult their physician to understand the risks involved. The risk categories and recommendations will be sent via email to all potential travelers approximately one month prior to travel.

3.1.4. Beginning 14 days prior to travel, and while deployed, all mission personnel will conduct a daily self-assessment of their health using the guidelines found at https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html. Individuals who feel ill should follow the guidelines found in the COVID-19 Emergency Response Plan (Appendix B). The individual's daily health assessment completion will be reported back to IMPACTS management via an electronic form that will be available and accessed only by management.

3.1.5. If an individual fails a daily health self-assessment, the steps laid out in the COVID-19 Emergency Response Plan (Appendix B) will be utilized.

3.1.6 IMPACTS has reduced the number of science support personnel at each deployment site. The staffing plan in Appendix E shows the skeleton crew necessary to run the campaign. Backup support personnel are (will be) identified from the participating institutions and a detailed list of travelers is being developed in parallel with this document. This measure is necessary to mitigate the risk caused by the more urgent need to minimally staff the deployment for health safety considerations.

3.2. Social Distancing

3.2.1. Prior to traveling for IMPACTS activities, all project participants – to the greatest extent possible – will 1) wear facial coverings (cloth masks or non-sterile disposable masks) when outside of their home and 2) stay at least six feet apart from anyone outside of their household. In addition, all personnel will agree to strictly adhere to all applicable local public health orders and institutional rules designed to reduce the transmission risk of COVID-19.

3.2.2. IMPACTS mission participants will maintain - as best as possible - a six-foot separation from all others at all times while participating in the mission. Note that the only mission activities that *require* IMPACTS personnel to be within six feet of one another are those activities related to instrument installation, use and maintenance. No ARC personnel are involved in these activities. For the remainder of the IMPACTS participants, the necessary mitigations for these activities are governed by the safety policies of AFRC, WFF and Dobbins ARB, respectively, as they occur either on their center or on aircraft that are managed by AFRC and WFF.

3.2.3. Only essential personnel will travel to support IMPACTS operations. Instrument teams were asked to minimize their personnel footprint. Interactions between teams that are on-site but who are not directly working together will be discouraged. ESPO (ARC) will travel to AFRC, WFF and Dobbins ARB only.

3.2.4. IMPACTS will be working with a “Skeleton Crew” or minimal personnel footprint in the field at a given time (Max 36 for the P-3 and Max 20 for ER-2). This is a significant reduction in on-site staff as the original plan called for 40-50 personnel. Use of the hangars and indoor office facilities will be minimal and on an as-needed basis. Teams will be encouraged to compartmentalize to the greatest extent possible and office spaces will be configured in such a way to support this (see the appropriate RTOW Plan for more details). Interactions between on-site teams who are not directly working together will be discouraged. Personnel on different teams will be assigned to separate workspaces or offices where possible. Tables and chairs will be set up to allow for 6 feet between personnel. Mission direction involving project leadership and the mission science team will occur primarily remotely, with a very small local presence.

3.2.4.1. On flight days, maintenance crew will be permitted onsite for the regular amount of time needed to prepare the aircraft for safe operations. All flight planning activities and briefings will occur remotely via phone or WebEx, as much as is reasonably practicable. On non-flight days, only aircraft or science instrument maintenance activities will be permitted on site. All other work during the mission will occur remotely.

3.2.4.2. Personnel will use facial coverings (cloth masks or non-sterile disposable masks) and six-foot separation will be required. If the weather is favorable, masked/socially distanced working outdoors will be considered.

3.2.4.3. Ground support activities are a responsibility of Wallops (P-3) and AFRC (ER-2) and are covered under the respective RTOW (i.e. Aircraft towing, maintenance, fueling, etc.).

3.2.4.4 Regarding Air recirculation on the P-3: During flight, cabin air exchanges every 2 minutes, the Wallops/P-3 RTOW has been reviewed and no changes to the ventilation rate were requested. Other regulations include maintaining a social distance at all times and when not possible (inside the aircraft) face shields must be worn in combination with a face mask.

3.2.5. All deployed personnel will be encouraged to s*helter-in-place* while deployed. In this context, *shelter-in-place* is defined as only leaving your accommodations for work or for *essential activities*, which are defined by the prevailing local public health orders. In addition, all personnel will be restricted to utilizing single-occupancy accommodations while traveling in support of the campaign.

3.2.6. All deployed personnel will be advised to book and utilize their own rental car for the purposes of personal transportation.

3.2.6.1. Carpooling will not be permitted prior to and during the IMPACTS integration and deployment phases.

3.2.6.2. Use of taxis and ride sharing services (e.g., Uber, Lyft) will not be permitted prior to and during the IMPACTS campaign.

3.2.7. All IMPACTS QNCs (flyers) will adhere to the in-flight rules that govern Wallops, as Wallops considers the aircraft to be an extension of their center.

3.2.8. No IMPACTS public events are planned at any of the locations. Signs will be posted by ESPO personnel noting that access to facilities will be restricted to IMPACTS personnel. Virtual events guided by the PI team will be allowed.

3.2.9. Communal dining areas will be set up for use during integration and deployment of IMPACTS participants at Wallops. Kitchen facilities will be used by one person at a time, and cleaning before and after use will be required. At Dobbins ARB we are expecting the project to be able to set up communal use of refrigerators, microwaves, coffee makers, water coolers, etc. Users will be required to clean these shared spaces before and after use. Project personnel will be permitted to bring in single serve water bottles and snacks. Any food brought on site should be for personal consumption only.

3.2.10. ESPO will post signs, tape marks, or other visual cues such as decals or colored tape on the floor, placed six feet apart, to indicate proper social distancing where appropriate. Examples of signs that will be hung can be found at https://www.cdc.gov/coronavirus/2019-ncov/communication/print-resources.html.

3.2.11. When interacting with external, non-IMPACTS individuals, project participants are encouraged to follow normal social distancing protocols (e.g. use of cloth face masks and six-foot distancing between individuals). See Appendix C for further information. Examples of possible interactions include delivery personnel, refuel personnel, and installation security.

3.3. Personal Protective Equipment (PPE)[1]

3.3.1. IMPACTS participants utilizing the AFRC ER-2 or WFF P-3 will adhere to the PPE rules of AFRC and WFF, respectively, when working onboard or around these aircraft. When off or away from the aircraft at Dobbins ARB, the IMPACTS Operations Health and Safety rules apply.

[1] PPE requirements at mission participants' home institutions or at NASA centers supporting instrument integration will be governed by the respective institutional or center wide policies.

3.3.2. All IMPACTS personnel will be required to wear face coverings (cloth masks or non-sterile disposable masks) at all times. Personnel will be instructed to bring a minimum of three appropriate face coverings each, but ESPO will have an available backup supply of appropriate face coverings. If for any reason it becomes necessary for personnel to work within six feet of each other outside of the situations listed in Section 3.2.2, a face shield or goggles, in addition to an appropriate face covering, will be required. ESPO will provide face shields or goggles for non-air crew.

3.3.3. While participating in integration, deployment or deintegration, all personnel will be required to wear facial coverings (cloth masks or disposable surgical masks) when off base and not in their accommodations.

3.3.4. All Qualified Non-Crew (QNC) will use designated headsets during flights. Assignment of and handling of such headsets will be managed as stated on the NASA WFF RTOW plan.

3.3.5. ESPO has a large inventory of the following PPE and cleaning supplies available for use:

- Disposable face masks
- Hygiene supplies (sanitizer, soap, paper towels, no-touch trash receptacles, tissues, etc.)
- EPA-approved[2] disinfectant wipes or spray
- Non-sterile nitrile gloves (for cleaning surfaces)
- Face shields/safety goggles
-

In addition, ESPO will be sending PPE to Dobbins ARB and Wallops. An ESPO representative will be on site during deployment to make sure there are enough supplies. During virtual support times (integration) the PPE will be sent to the aircraft PM at Armstrong and Wallops. Additional shipments can be made if needed.

3.3.6. During the deployment phase of IMPACTS, an ESPO site manager will be on site at Wallops and Dobbins ARB to enforce the PPE and social distancing rules as described in this plan. Individuals in violation of mission or center rules can be subject to removal from the campaign. The team will also be briefed on an “if you see something, say something” policy and can report observations to the ESPO site manager.

3.4. Cleaning/Hygiene Protocols[3]

3.4.1. Janitorial contracts at the two IMPACTS NASA field locations are consistent with CDC guidelines for enhanced cleaning of commonly touched surfaces. We will determine if Dobbins hangar cleaning should be augmented and procure janitorial

[2] A list of EPA-approved disinfectants for use against COVID-19 can be found at https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2

[3] Cleaning/hygiene protocols at mission participants’ home institutions or at NASA centers supporting instrument integration will be governed by the respective institutional or center wide policies.

services if necessary. See Appendix D.4 for further details. The project in general will advocate that the following minimum cleaning guidelines be implemented:

3.4.1.1. Surfaces frequently touched by multiple people, such as door handles, desks, phones, light switches, and faucets, should be cleaned and disinfected at least daily. More frequent cleaning and disinfection may be required based on level of use. Aircraft cleaning guidelines will follow the Wallops RTOW plan.

3.4.1.2. ESPO will supplement this protocol with additional cleaning measures as necessary based on the level of use through the hiring of contract janitorial services. All IMPACTS personnel will be supplied with the PPE and cleaning supplies listed in Section 3.3.5 to aid in the cleaning of their personal property and workspaces.

3.4.1.3. If not already provided, ESPO will mount or add hand sanitizing stations at entryways, outside of bathrooms, and in close proximity to workspaces at all IMPACTS deployment locations.

3.4.2. Cleaning protocols on site and in flight for the NASA Aircraft will be governed by the respective center policies.

3.4.3. All personnel will be reminded to wash their hands frequently with soap and warm water for at least twenty seconds, especially after being in a public place or after eating, using the restroom, blowing their nose, coughing, or sneezing[4]. If soap and water are not readily available, deployed personnel should use a hand sanitizer that contains at least 60% alcohol. ESPO will ensure that all IMPACTS deployment locations are well stocked with liquid hand soap, hand sanitizer, and paper towels.

3.4.4. ESPO will post signs and posters reminding people to frequently wash their hands and to practice good hygiene as recommended by the CDC[5].

3.4.5 ESPO will ensure that safe disposal of PPE, wipes, etc. is done following local regulations at NASA Wallops and Dobbins ARB.

3.5. Communication and COVID-19 Emergency Preparedness/Response

3.5.1. First and foremost, all mission participants will be instructed early and often to **STAY HOME** if they begin experiencing any of the symptoms listed in Appendix B.1.

3.5.2. ESPO will provide all mission participants with a deployment guide that will include a contact list and this deployment health safety plan that will address the following topics:

[4] https://www.cdc.gov/handwashing/when-how-handwashing.html
[5] https://www.cdc.gov/handwashing/materials.html

3.5.2.1. Each mission participant will be provided information on what to do if they get sick. Reference Appendix B – COVID-19 Emergency Response Plan.

3.5.2.2. Mission participants who begin to feel sick on site or off duty while on deployment should follow Appendix B – COVID-19 Emergency Response Plan.

3.5.2.3. Each mission participant will be provided information on what to do if other team members get sick. Reference Appendix B – COVID-19 Emergency Response Plan.

3.5.2.4. Each mission participant deployed will be provided information on how to communicate concerns and issues.

3.5.3. Flight crew and QNCs (on board the P-3) who begin to feel sick while in-flight should follow the rules from the NASA Wallops RTOW plan.

3.5.4. Mission participants who have knowledge of being in close contact with another person who is sick or has a confirmed case of COVID-19 while deployed will notify ESPO immediately and remain in their accommodations while waiting for further instructions.

3.5.5. ESPO will monitor the guidance from all local public health offices and alert mission participants to any changes in guidance.

3.5.6. ESPO will disseminate a Plan of the Day, which will include any necessary updates regarding COVID-19, center access, local restrictions, etc.

3.6. Facilities

3.6.1. ESPO and respective mission managers will contact center management at NASA AFRC, NASA WFF and Dobbins ARB, to ensure that HVAC and potable water systems are in working order prior to RTOW.

3.6.2. ESPO will verify that management has completed their walkthrough and assessment of the designated workspaces prior to RTOW at the different NASA centers and Dobbins ARB.

3.6.3 ESPO will verify that the mission facilities to be used by mission participants (hotel and airport facilities (at Dobbins ARB)) are adequately set up to implement the safety measures outlined in this document and provide a safe work environment.

3.7. Train / Inform Mission Participants

The IMPACTS Operations Health and Safety Plan, along with all rules and regulations governing the mission, will be first disseminated electronically to all personnel participating in IMPACTS. It should be noted that anyone found in violation of these rules and regulations may be prohibited from participating in the field deployment and sent home from their deployment

location (AFRC, WFF, or Dobbins ARB). All participants will be asked to acknowledge (via email) receipt of said training and agreement to adherence to the IMPACTS Operations Health Safety Plan.

3.7.1. ESPO will ensure that all required certified training (including foreign national escort) and medical exams are current for all the appropriate IMPACTS participants.

3.7.2. All IMPACTS personnel will receive virtual COVID-19 related safety training approximately one month before the integration phase, followed by a refresher class one week before the deployment phase (see Section 2).

3.7.3. ESPO will ensure that each mission participant or support contractor covered by this plan completes all the respective (ARC, AFRC, GSFC, MSFC, LaRC, WFF and Universities) training required by their home institutions. Project participants deploying at Dobbins ARB will be required to complete the ARC “COVID-19 and Returning to On-site Work” SATERN training module at ARC (COURSE # ARC-003-08)]. For participants who don't have access to SATERN, the training materials will be distributed via email.

3.7.4. ESPO will draft and disseminate a written safety orientation briefing approximately one month prior to mission start regarding the COVID-19 protective measures and mitigations discussed in this plan (e.g., social distancing, proper use of PPE, disinfecting high-touch areas, handwashing, etc.) with particular emphasis on the measures that will be the individual responsibility of all deployed personnel (e.g., **STAY HOME** if you start to feel ill, what to do if a teammate starts to feel ill, etc.). A draft of this briefing will be sent to all the IMPACTS participants for review. In addition, we will review this safety orientation briefing via WebEx approximately one week prior to mission start (start of the deployment phase) to cover and reinforce all key rules and regulations. Attendance for this briefing will be mandatory.

3.7.5. ESPO will make sure that all mission participants will also receive any additional safety plans and information from other centers when applicable. In addition, all IMPACTS personnel will be briefed on which institutions' guidelines apply as described in Section 2.1.

3.8. Travel

3.8.1. Travel for non-civil servant project participants will be handled by SSAI, a LaRC contract used for this purpose on many airborne science projects. Travel for all civil servants will be handled by each individual NASA’s home center. Travel is only authorized from the traveler’s institution to NASA AFRC, NASA WFF and Dobbins ARB in Marietta GA. For individual NASA center travel requests, please refer to the appropriate Center policy.

3.8.2 Hotels: IMPACTS and ESPO management will recommend hotels to project participants that implement the CDC guidelines for cleanliness and infection

prevention: https://www.cdc.gov/coronavirus/2019-ncov/community/organizations/cleaning-disinfection.html .
Whenever possible, IMPACTS Travelers will be encouraged to use extended stay accommodations to allow each individual access to a private kitchen. This will be encouraged while deployed at WFF and Dobbins ARB.

Travel requirements specific to ARC/ESPO IMPACTS personnel are as follows:

- October 2020: Site visit to Dobbins ARB (Marietta, GA). This will include two ESPO personnel (one CS, one contractor) for a period of five days.
- November 2020: ESPO personnel (as shown in Appendix E) will travel to WFF to ensure the successful instrument integration and/or install the required IT equipment.
- January - February 2021: During the field campaign, there will be two ESPO personnel at each location, WFF and Dobbins, to manage the field activities. Each ESPO personnel will stay in a location for a minimum of 20 days to minimize COVID-19 exposure risk from travel. ESPO Field personnel will rotate, and they will have only one day of overlap in order to reduce the number of personnel present at a given location.
- March 2021: ER-2 (AFRC) and P-3 (WFF) Deintegration. There will be one ESPO person at NASA AFRC to support the logistics of equipment return.

3.9. ARC On-Site Access Requests

Work to support the IMPACTS deployment's four distinct project phases will include local logistics work at NASA ARC. The scope of NASA ARC work is as follows (Table 3):

Table 3. Work schedule that requires access to the ARC campus and ESPO Team Members supporting IMPACTS work at ARC.

NASA Center	Project phase	Description of the work	Dates	Who needs access	Time
ARC	Preparation	No work at center is required	N/A	N/A	N/A
	Integration	Prepping of support equipment to be shipped to NASA Wallops	01-09, November 2020	2 ESPO Team members	Business hours
	Deployment	No work at center is required	N/A	N/A	N/A
	De-integration	Storage of the return equipment	05-08, March 2021	2 ESPO Team members	Business hours

ESPO Team members supporting IMPACTS at ARC - only two persons required on site at a time for the work described above	
Project Manager - Vidal Salazar (CS)	Bernadette Luna (CS)
Deputy PM - Katie Stern (BAERI)	Dan Chirica (CS)
Logistics - Quincy Allison (BAERI)	Alex Stanfil (BAERI)
	Sommer Nicholas (BAERI)

ESPO team members working on-site at ARC during this phase of the project are Civil Servants (CS) and part of Code SGG BAERI employees operating under the cooperative agreement for S80NSSC19M0191.

- **Preparation Phase:** No on-site work at NASA ARC is expected. All preparation work can be accomplished virtually.
- **Integration Phase:** The ESPO logistics team will need access to N255 (Shipping and receiving), N144 (warehouse) and N232 (office space) to prepare support equipment (IT equipment such as printers, network and miscellaneous equipment) to be shipped.
- **Deployment Phase:** No on-site work at NASA ARC is expected during this phase.
- **Deintegration Phase:** The ESPO logistics team will need access to N255 (Shipping and receiving) and N144 (warehouse) to receive and store support equipment (IT equipment such as printers, network and miscellaneous equipment).

3.10 Dobbins ARB COVID-19 Protocols and Mitigations

The local Dobbins ARB rules and regulations for COVID-19 prevention, follow those of the US Air Force COVID precautions published here:

- https://www.af.mil/News/Coronavirus-Disease-2019/
- https://www.af.mil/Portals/1/200313-D-HN545-001.jpg

3.10.1 Specific Dobbins ARB COVID-19 Protocols

Specific requirements at Dobbins ARB include:

1. At the start of each day, high touch areas and common spaces should be sprayed with disinfectant spray and wiped down with disinfecting wipes.
2. Hand sanitizer will be available at all workstations and entry points.
3. Temperature check by the ESPO PM (or at the Dobbins ARB gate) and symptom screen will be conducted at the start of each duty day. Any personnel with temperature 100.4 degrees F or greater or with symptoms will be sent home and not allowed in.
4. Workspaces will allow 6 feet or greater distance.
5. Cloth masks need to be worn when entering and moving through the hangar and within 6 feet of other personnel. If in doubt of the distance, wear the mask!
6. At the end of day, disinfectant spray will be applied throughout the workspace.

The IMPACTS Operations Health and Safety Plan (this document) will apply at Dobbins ARB and when these requirements are more restrictive, they supersede what is requested locally. Furthermore, IMPACTS Project Management (ESPO) will ensure that the campaign personnel observe the Dobbins' protocols as requested. ESPO management will communicate on a weekly basis with Dobbins ARB during deployment to relay project status and ensure all protocols are being followed.

In the event of a positive COVID-19 case, or sickness of a team member, the project will follow the policies stated on Appendix B.3.

3.10.2 Workspace Layout at Dobbins ARB

ESPO is planning to visit Dobbins ARB at the end of October to finalize logistical details relevant to the deployment of the NASA ER-2 and to the required instrument teams in the available office and hangar space. After the site visit, the floor plan will be finalized and will reflect the

guidelines stated in this document (including all social distancing and PPE requirements. In addition, IMPACTS will implement the following guidelines at Dobbins ARB:

1. In-person gatherings/meetings will be discouraged during the deployment. All project meetings and communications with the IMPACTS Base of Operations at NASA WFF will be done virtually. Because limited office space is available at Dobbins ARB, ESPO Project Managers will set up additional working areas around the hangar floor as shown in Appendix G.
2. Furthermore, the limited office space will be assigned to AFRC personnel only. They will not share office space with other IMPACTS instrument scientists. All office space occupants are expected to follow project regulations and mitigations of COVID-19 as stated in the AFRC RTOW plan and this document (the most restrictive).

As mentioned above, personnel will limit their time in the workspace to activities that can only be achieved in that venue. These activities are generally limited to activities that might demand in-person communications such as pre-flight activities, flight control operations, and post-flight data processing. Pre-flight and post-flight briefings, which would typically occur in a conference room, will either be held remotely in the safety of each individual's hotel room, in the hangar w/ the hangar door open, or outdoors, always maintaining physical distance.

3.10.3 Manpower at Dobbins ARB

The manpower required to support the IMPACTS operations at Dobbins ARB are identified in Appendix E specifically for the ER-2 support of instrument teams. ESPO team members required to support IMPACTS at Dobbins ARB are identified in Appendix F for operational support for the ER-2. The overall number of participants including air crew, science and logistics support personnel are shown in Table 2.

Appendix A. IMPACTS ER-2 and P-3 aircraft team members and deployment locations.

Table 4. Aircraft and Instrumentation Supporting the IMPACTS Campaign (Please see Appendix H for the acronym list).

ER-2 Aircraft: Remote Sensing Instruments	**Org**	**Integration & Mobilization Site**	**Deployment Site**
CRS: Cloud Radar System	GSFC	AFRC (Edwards, CA)	Dobbins ARB (Marietta, GA)
HIWRAP: High Altitude Imaging Wind & Rain Airborne Profiler	GSFC		
EXRAD: ER-2 Z-Band Doppler Radar	GSFC		
CoSMIR: Conical Scanning Millimeter-wave Imaging Radiometer	GSFC		
AMPR: Advanced Microwave Precipitation Radiometer	MSFC		
CPL: Cloud Physics Lidar	GSFC		
P-3 Aircraft: *in situ* Instruments	**Org**	**Integration & Mobilization Site**	**Deployment Site**
CDP: Cloud Droplet Probe	UND	WFF (Wallops, VA)	WFF (Wallops, VA)
CAPS: Cloud, Aerosol and Precipitation Spectrometer	UND		
2D-S: 2D-S Probe	UND		
HVPS-3: High Volume Precipitation Spectrometer	UND		
Nevzorov: Nevzorov Probe	UND		
King: King Probe	UND		
Hawkeye: Hawkeye Probe	GSFC		
RICE: Rosemount Icing Probe	UND		
WISPER: Water Isotope System for Precipitation and Entrainment Research	OSU		
TAMMS: Turbulent Air Motion Measurement System	LaRC		
AVAPS: Advanced Vertical Atmospheric Profiling System	NCAR		

Appendix B. COVID-19 Emergency Response Plan

This guidance has been developed in order to conduct the IMPACTS campaign with the highest level of regard to the safety of the participants. However, despite the development and implementation of measures to mitigate the risk of COVID-19 infection, the risk still exists.

B.1. COVID-19 Symptoms

The following symptoms may appear 2-14 days after exposure[6]:

- Fever or chills
- Cough
- Shortness of breath or difficulty breathing
- Fatigue
- Muscle or body aches
- Headache
- New loss of taste or smell
- Sore throat
- Congestion or runny nose
- Nausea or vomiting
- Diarrhea

B.2. Sickness or Confirmed COVID-19 Test Prior to Travel

Starting 14 days prior to travel, all primary and alternate mission participants will conduct daily health self-assessments. If a participant begins to feel ill prior to traveling to either the integration or deployment sites, then the participant should take the following steps:

- Stay at home and self-isolate
- Seek medical guidance from their personal physician
- Notify their supervisor and the IMPACTS project manager

If the participant falls ill (or tests positive for COVID-19), then a previously identified alternate will deploy instead (if necessary), provided there has been no close contact with the ill participant or with anyone else who has been diagnosed with COVID-19. To the greatest extent possible, a “bubble” strategy will be utilized to minimize the risk of spread between primary participants and alternate participants.

B.3. Sickness or Confirmed COVID-19 Test During Integration and Deployment

B.3.1. Off-Duty

If a participant first begins to experience symptoms while off duty at the deployment site, then the participant should take the following steps:

[6] https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html

- Do not report to work on-site and self-isolate
- Seek medical guidance from their personal physician
- Notify their supervisor and the IMPACTS project manager

The IMPACTS project manager will then:

- Notify line management and the respective center's Medical Director

B.3.2. While at Work

If a participant starts to feel ill while at work, then the participant should take the following steps:

- Immediately leave the work site and go back to their lodging to self-isolate
- Seek medical guidance from their personal physician
- Notify their supervisor and the IMPACTS project manager

The IMPACTS project manager will then:

- Notify line management and the respective center's Medical Director

NOTE: If onset of illness occurs while in flight, the applicable flight rules will be implemented.

B.3.3. COVID-19 Testing Locations

If after consultation with their personal physician, it is determined that the participant should be tested for COVID-19, the participant should get tested as soon as possible. ESPO will have the most up to date information on free COVID-19 testing sites, many of which are drive through facilities. Please contact your ESPO personnel to get that information.

B.3.4. While Waiting for Test Results

Mission Participant Waiting for Test Result

While waiting for a test result, the participant should follow the guidance found at https://www.sccgov.org/sites/covid19/Pages/learn-what-to-do.aspx#section_one

Other Mission Participants

While a participant waits for test results, the IMPACTS PI and PM will act on the advice of the respective center's Medical Director and management with regard to continuing mission operations.

B.3.5. In the Event of a Confirmed COVID-19 Case During Deployment

Mission Participant with Confirmed Case

If a participant has a confirmed case of COVID-19, then the participant should take the following steps:

- Put on a mask and avoid contact with others until obtaining further direction from their health care provider
- Follow the guidelines found at https://www.sccgov.org/sites/covid19/Pages/learn-what-to-do.aspx#section_two
- Notify their supervisor and the IMPACTS project manager

The IMPACTS project manager will then:

- Notify line management and the respective center's Medical Director

Contact Tracing

If the participant tests positive for COVID-19, or if the respective center's Health and Safety Office determines it is advisable, then the participant will need to make a list of individuals for the purposes of contact tracing who they were within six feet for longer than six minutes that may have been exposed and locations visited in the three days prior to experiencing symptoms. Mission participants will be advised to maintain a log of contacts who meet this criterion. This information will be provided to the respective center's Health Unit for contact tracing purposes.

Appendix C. Further Information on Social Distancing Protocols

Commercial Flights

In the cases where it is necessary for individuals to take a commercial flight to participate at one of the either IMPACTS phases integration or deployment, it will be recommended that mission participants wear facial coverings (e.g., cloth masks or non-sterile disposable masks) during the entire flight. It will also be recommended that travelers bring a supply of disinfectant wipes to clean armrests and meal trays.

Workspace Considerations

As mentioned in Sec. 3.2 above, IMPACTS personnel will limit their time in lab, hangar, and office spaces to activities that can only be achieved on site. These activities are generally limited to minimal pre-flight activities, flight operations, and post-flight data processing. Pre-flight and post-flight briefings, which would typically occur in a conference room, will either be held remotely in the safety of each individual's hotel room or in small groups that are socially distanced.

Operations will rely on the concept of compartmentalization of personnel to minimize the risk of a COVID-19 outbreak. However, it will be necessary for air crew and instrument operators of each of the two aircraft to be together inside an aircraft cabin for many hours for a research flight[7].

External Interactions

In the case where it is necessary for IMPACTS personnel to interact with non-IMPACTS individuals, it is recommended that IMPACTS personnel wear facial coverings (e.g. cloth masks or non-sterile disposable masks) and maintain a distance of at least 6 feet where possible.

[7] See the AFRC and WFF flight safety plans for precautions and mitigations that will be employed during flight and routine maintenance

Appendix D. Further Information on Cleaning Protocols[8]

D.1. General Cleaning Guidelines

1. Cleaning is everyone's responsibility. Employees need to clean areas they come in contact with, especially if they handle equipment shared with other employees.
2. Clean all frequently touched surfaces in the workplace, such as workstations, countertops, doorknobs, phones, and tools. Other areas in or around offices include telephones, arm rests of chairs, light switches (under cabinet and wall), door handles, curtains/blinds, printer/copier touchpads and lids, projector controls, whiteboard markers and erasers.
    a. For mission operations centers –wipe down all hand-touch surfaces on shared equipment after use.
    b. For conference rooms - meeting hosts should clean conference tables and hard surfaces such as chair armrests before and at the conclusion of each meeting.
    c. Do not drink directly from water fountains. Instead, sanitize your hands, and then fill personal containers using water fountains.
3. Use the cleaning agents that are supplied or approved by the center in these areas and follow the directions on the label.
4. Apply spray disinfectants directly on wipes, not directly on electronic equipment or phones.
5. Care must be taken when cleaning screens of any kind, for example, computers, telephones and pads. Only follow manufacturers' recommendations for how and what to use to clean screens, they may be sensitive to some chemicals

D.2. Cleaning a Private Workspace

1. Disinfect all surfaces upon arriving for the day, like your desk, chair, phone, keyboard, mouse, pointer, writing utensils and touch screens, if you can.
2. Only use cleaning products supplied or approved by your center.
3. Follow manufacturer's guidance for cleaning and, if no guidance is provided, use alcohol-based wipes or sprays containing at least 60% alcohol.
4. Do not mix your own cleaning products and bring them to your NASA worksite.
5. Read cleaning labels and directions before use.
6. Unplug electronic devices before cleaning.
7. Avoid spraying electronics or keyboards directly with cleaning supplies.
8. Consider removing unneeded items from your workspace to reduce handling or contact from multiple people.
9. Continue to disinfect your workspace regularly throughout the day.

D.3. Cleaning a Shared Workspace

1. Avoid using other employees' office equipment, including phones, desks, chairs, writing utensils, keyboards, mouse pointers, etc.

[8] From the ARC COVID-19 Health and Safety Guidance for Employees Returning to On-Site Work, Rev 3

2. Clean and disinfect other employees' office equipment before and after use, if you must use it.
3. Disinfect all spaces, including desks, counters, shared tools and shared equipment regularly throughout the day.
4. Avoid holding in-person meetings and instead opt for virtual meetings.
5. Disinfect conference tables, chairs, remote controls, writing utensils, light switches and shared electronics, if you must meet in person.
6. Maintain at least 6 feet of distance between yourself and others and continue wearing cloth face coverings throughout any face-to-face meetings.

D.4. Enhanced Cleaning

1. A janitorial contractor will clean and disinfect some frequently touched surfaces. Cleaning and disinfection will be conducted more frequently than normal cleaning during the time public health orders require measures to prevent the spread of the disease.
2. The contractor shall clean and disinfect using EPA registered disinfectants effective for COVID-19.
3. Frequently touched surfaces in buildings that will be cleaned by a janitorial contractor include:
    - Entrance doors to all buildings occupied IMPACTS participants: Clean and disinfect door handles, both outside and inside of doors.
    - Handrails on stairs: Clean and disinfect handrails in all buildings occupied by IMPACTS participants.
    - Elevators: Clean and disinfect call buttons and control panels.
    - Conference rooms: Clean and disinfect hand contact surfaces. Hand contact surfaces include conference table, side tables, hard surface armrests and backs of chairs, conference phone, and doorknobs.
    - Rest rooms: Damp/wet mop and disinfect floors, refill all dispensers, clean and disinfect all fixtures (i.e., toilets, urinals, sinks, etc.), clean and disinfect mirrors and mirror framing, walls, partitions, doors, and showers, including trims, framings, kickplates, etc.

Appendix E. Fall and Winter 2020-2021 IMPACTS Staffing Plan

As a preventive measure against COVID-19, the IMPACTS management team reduced the number of science personnel deploying at the different project locations to a minimum (IMPACTS skeleton crew). It is important to note that aircraft operations and the aircraft crew required to operate the NASA ER-2 and NASA P-3 cannot be minimized. For an accurate number of project participants that includes the aircraft crews, please refer to the aircraft specific RTOW plan)

Table 5 shows the maximum number of science support people required to support the IMPACTS Operations Center and the P-3 aircraft operations at NASA Wallops. The project participants are distributed as follows: 8 people for integration efforts (instrument uploads), 13 people to support the P-3 IMPACTS instrumentation during the deployment phase (6 of them will actively fly on the P-3 missions) and 6 people to remove the instruments from the plane (deintegration). Table 5 includes the science team that will manage the daily project activities such as forecasting, data processing and mission management. Table 5 does NOT include aircraft crew and support teams (approximately 15 people).

Table 5. Staffing skeleton requirements at the IMPACTS Operations Center at NASA Wallops in support of the P-3 aircraft and overall mission management.

IMPACTS Operations Center									
P-3 team									
P-3 instrument team		**Integration (NASA Wallops)**		**Deployment (NASA Wallops)**				**De-Integration (NASA Wallops)**	
Team	Instrument	Number of people needed	# of days at Wallops	Number of people needed at Wallops	# of days at Wallops	# of people flying on the P-3	Travelers are from:	Number of people needed	# of days at Wallops
UND	CDP, CAPS, 2D-2, HVPS-3V, HVPS-3H, Nevzorov, King, Rosemount, RICE, Hawkeye, WCM200	3	10	2	50	2	North Dakota	2	5
NASA LaRC	AVAPS TAMMS	1	5	1	50	1	Virginia	1	2
UofC Boulder	WISPER	2	5	1	50	1	Colorado	1	4
NASA AFRC	NSRC	1	5	1	50	1	California	1	4
Science Team									
Science crew		Number of people needed	# of days at Wallops	Number of people needed at Wallops	# of days at Wallops	# of people flying on the P-3	Travelers are from:	Number of people needed	# of days at Wallops
	Lead Scientist	0	0	1	50	0	Washington	0	0
	Mission Scientist	0	0	1	50	0	Illinois, Oklahoma, Virginia	0	0
	P-3 Scientist	0	0	1	50	1	Illinois, Oklahoma, Virginia	0	0
	Chief Forecaster	0	0	1	50	0	Virgina	0	0
	Aircraft Coordinator	0	0	1	50	0	Florida	0	0
	Navigator	0	0	1	50	0	California	0	0
	Data Manager	0	0	1	30	0	Washington	0	0
	ESPO	1	7	1	55	0	California, Colorado	1	2
	Total	8		13		6		6	

Table 6 shows the maximum number of science support people required to support the ER-2 aircraft operations at NASA AFRC and Dobbins ARB. The project participants are distributed as

follows: 7 people for integration efforts (instrument uploads), 8 people to support the ER-2 IMPACTS Operations (including Science support) and 6 people for deintegration efforts at the end of the campaign. Table 6 does not include ER-2 aircraft crew required for operations (~20 people)

Table 6. Staffing skeleton requirements at NASA AFRC and Dobbins ARB in support of the IMPACTS ER-2 Operations.

ER-2 team (RTOW AFRC and Dobbins ARB)		Integration (NASA AFRC)		Deployment (Dobbins ARB)			De-Integration (NASA AFRC)	
Team	Instrument	Number of people needed	# of days at AFRC	Number of people needed at Dobbins	# of days at Dobbins	Travelers are from:	Number of people needed	# of days at AFRC
NASA MSFC	AMPR	1	4	1	50	Virginia	1	3
NASA GSFC	CPL	1	4	1	50	Virginia	1	3
	CRS, EXRAD, HIWRAP	2	4	2	50	Virginia	1	3
	LIP	1	4	1	50	Virginia	1	3
NASA AFRC	NSRC	1	4	1	50	California	1	3
NASA ARC	ESPO (logistics support)	1	4	1	50	California	1	1
	IMPACTS Science			1	50	TBD		
	Total	7		8			6	

Appendix F. ARC ESPO Staffing Plan

ARC/ESPO is planning to staff all IMPACTS efforts and operations as follow (Table 7):

- Preparation phase: Virtual support, no travel is required (Yellow cells).
- Integration phase: Logistic/Shipping support at AFRC and will help virtually on integration of the NASA ER-2 aircraft (Blue cells @AFRC)
- Deployment phase: 2 Project managers (PM and DPM) at Wallops (P-3 and Operations Center) at any one time for project support and daily operations. At Dobbins ARB, ESPO is planning on deploying a single project manager at any given time with an identified backup that will be ready to travel to the field at a given notice to replace the project manager in case he/she falls ill. Logistics support will also be deployed at Wallops. (Pink Cells @NASAWallops and @Dobbins ARB)
- Deintegration phase: Logistics and shipping support at Dobbins for return equipment to AFRC (Blue cells @AFRC)

Table 7. Detailed ESPO Staffing support for IMPACTS 2020-2021

ESPO IMPACTS 2020-2021

Updated Sep 3, 2020

ESPO Support for ER-2 Activities

Type of Support			ER-2 Aircraft Schedule					
Virtual (no travel required)	TDY (on site)	Civil Servant/ Contractor	Personnel ESPO	Task	Location	Start	End	Duration (Days)
	@ Dobbins ARB	CS NASA ARC	Vidal - PM	Site Survey	ATL	10/19/20	10/22/20	3
	@ Dobbins ARB	Contractor	Katie - DPM	Site Survey	ATL	10/19/20	10/22/20	3
	@ Dobbins ARB	Contractor	Quincy - Logistics	Site Survey	ATL	10/19/20	10/22/20	3
Virtual Support		CS NASA ARC	Vidal - PM	Integration	AFRC	11/16/20	11/24/20	8
Virtual Support		Contractor	Katie - DPM	Test Flights	AFRC	11/30/20	12/10/20	10
	@ NASA AFRC	Contractor	Quincy - Logistics	Shipping	AFRC	1/4/21	1/9/21	5
	@ Dobbins ARB	Contractor	Sommer - Logistics	Receiving/setup	ATL	1/4/21	1/10/21	6
	@ Dobbins ARB	CS NASA ARC	Dan - IT	Setup IT	ATL	1/4/21	1/10/21	6
	@ Dobbins ARB	Contractor	Katie - PM	Deployment 1	ATL	1/4/21	1/25/21	21
	@ Dobbins ARB	TBD	Backup TBD	Deployment 1	ATL	1/4/21	1/25/21	
	@ Dobbins ARB	CS NASA ARC	Bernie - PM	Deployment 2	ATL	1/24/21	2/13/21	20
	@ Dobbins ARB	TBD	Backup TBD	Deployment 2	ATL	1/24/21	2/13/21	
	@ Dobbins ARB	CS NASA ARC	Dan - PM	Close-Out	ATL	2/12/21	3/4/21	20
	@ Dobbins ARB	TBD	Backup TBD	Close-Out	ATL	2/12/21	3/4/21	
	@ Dobbins ARB	Contractor	Quincy - Logistics	Pack-Up	ATL	2/26/21	3/5/21	7
	@ NASA AFRC	Contractor	Sommer - Logistics	Shipping Receive	AFRC	3/4/21	3/8/21	4

ESPO Support for P-3 Activities

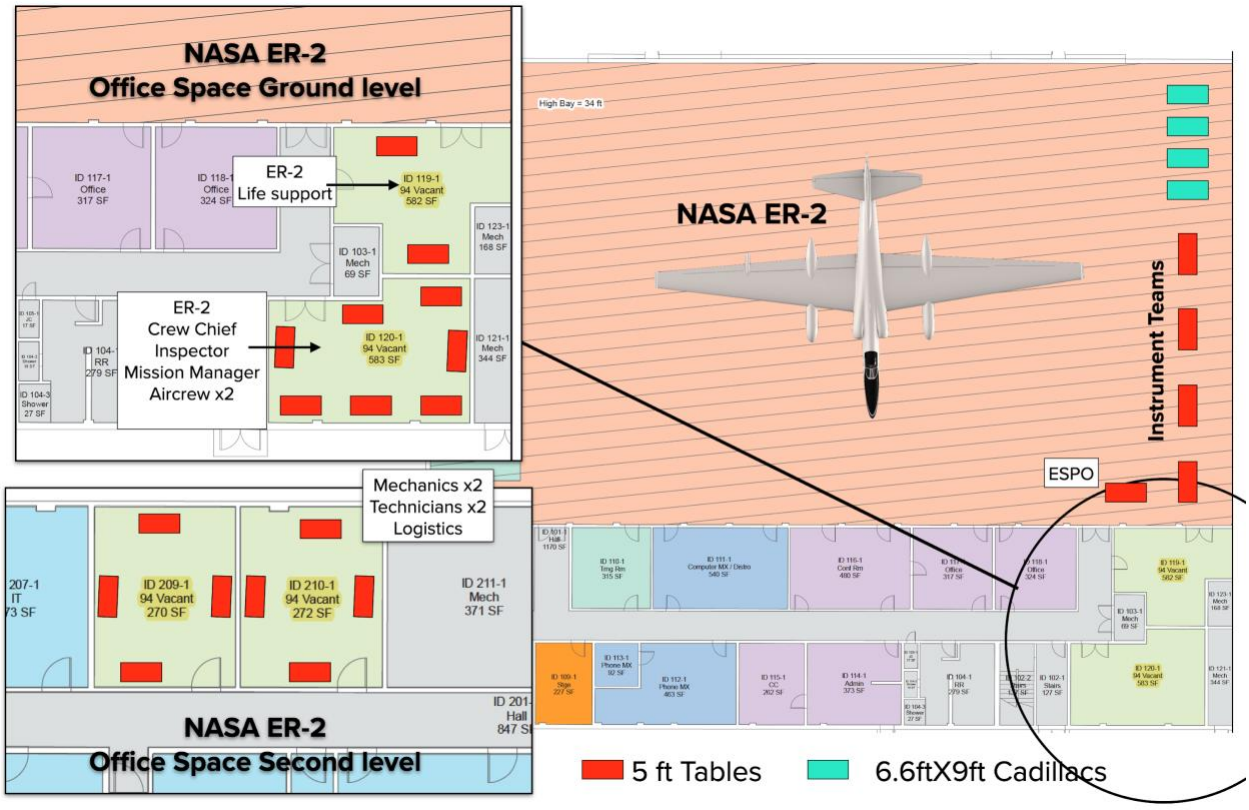
Type of Support			P-3 Aircraft Schedule					
Virtual (no travel required)	TDY (on site)	Civil Servant/ Contractor	Personnel ESPO	Task	Location	Start	End	Duration (Days)
Virtual Support		Contractor	Katie - DPM	Integration	WFF	11/16/20	11/20/20	5
Virtual Support		CS NASA ARC	Vidal - PM	Integration	WFF	11/30/20	12/11/20	12
	@ NASA Wallops	CS NASA ARC	Vidal - PM	Deployment 1	WFF	1/7/21	1/25/21	19
	@ NASA Wallops	Contractor	Caitlin - DPM	Deployment 1	WFF	1/7/21	1/25/21	19
	@ NASA Wallops	Contractor	Alex - IT	Setup IT	WFF	1/7/21	1/12/21	6
	@ NASA Wallops	CS NASA ARC	Jhony - PM	Deployment 2	WFF	1/24/21	2/13/21	21
	@ NASA Wallops	Contractor	Quincy- DPM Backup	Deployment 2	WFF	1/24/21	2/13/21	21
	@ NASA Wallops	CS NASA ARC	Vidal - PM	Close-Out	WFF	2/13/21	3/3/21	19
	@ NASA Wallops	Contractor	Katie - DPM Backup	Close-Out	WFF	2/13/21	3/3/21	19
	@ NASA Wallops	Contractor	Stevie - Logistics	Shipping	WFF	2/28/21	3/3/21	4

Appendix G. Work area at Dobbins ARB

Dobbins ARB has limited office space available for IMPACTS. A site survey will be carried out by the ESPO and ER-2 project management team in late October to finalize the logistics of deploying at this location. Preliminary assessment of the facilities at Dobbins ARB show that there are 4 (spaces) offices available; these offices will be assigned to AFRC project support personnel (ER-2 life support team, Crew Chief, Inspector, Mission manager, mechanics, technicians and logistics personnel as shown in Figure 1). IMPACTS instrument teams and ESPO project managers are planned to be located on the hangar floor next to the ER-2 aircraft in separate 5 ft tables (1 instrument team per table). The distribution of tables and work areas will follow social distancing guidelines and requirements as stated on section 3.10.1 and 3.10.2 and Appendix C. In some cases, teams will need two tables and the final Figure 1 will have to be modified based on the site visit results.

ER-2 support equipment includes four military style shipping containers ("Cadillacs" as shown in Figure 1). The location of these containers will also be finalized at the time of the site survey.

Figure 1. Dobbins ARB floor plan proposed for the IMPACTS deployment (not to scale).



Appendix H. Acronym List

ARC	Ames Research Center
AFRC	Armstrong Flight Research Center
CDC	Center for Disease Control
ESD	Earth Science Division
ESPO	Earth Science Project Office
EVS-3	Earth Venture Suborbital-3
GSFC	Goddard Space Flight Center
HQ	Headquarters
HVAC	Heating, Ventilation, and Air Conditioning
IT	Information Technology
LaRC	Langley Research Center
NAMS	NASA Access Management System
NASA	National Aeronautics and Space Administration
NCAR	National Center for Atmospheric Research
NCSU	North Carolina State University
NLT	No Later Than
ORR	Operational Readiness Review
OSU	Oregon State University
PI	Principal Investigator
PM	Project Manager
PPE	Personal Protective Equipment
PSU	Pennsylvania State University
QNC	Qualified Non-Crew
RTOW	Return to On-site Work
SBU	Stony Brook University
SMA	Safety and Mission Assurance
SSAI	Science Systems and Applications Inc.

UICU	University of Illinois Champaign Urbana
UND	University of North Dakota
UofC Boulder	University of Colorado at Boulder
UW	University of Washington
WFF	Wallops Flight Facility

Appendix I. References

[1] Letter from Gail Skofronick-Jackson classifying IMPACTS as a Major Impact project.

From: "Jackson, Gail Skofronick (HQ-DK000)" <gail.s.jackson@nasa.gov>
Date: Thursday, August 6, 2020 at 12:10 PM
To: "Jackson, Gail Skofronick (HQ-DK000)" <gail.s.jackson@nasa.gov>
Cc: Lynn McMurdie <lynnm@uw.edu>, Lynn McMurdie <lynnm@washington.edu>, "Salazar, Vidal (ARC-SGG)" <vidal.salazar@nasa.gov>
Subject: IMPACTS Return to Onsite Work

Dear NASA Centers working with the IMPACTS EV-S campaign,

*As prescribed by Karen St. Germain's new process*** for restarting on-site work and field campaign flights, I, as Program Scientist of this program, hereby declare Investigation of Microphysics and Precipitation for Atlantic Coast-Threatening Snowstorms (IMPACTS) as a field campaign activity with "major impact" to NASA's research program if not held as scheduled November 2020 (integration phase) through the end of February 2021 (deployment phase). The IMPACTS investigation supports the Science Mission Directorate's Earth Science Division mission by providing new approaches to the identification of key processes in snowband formation and improving remote sensing (including for NASA's GPM) and forecasting/modeling of snowfall in the Eastern United States. IMPACTS, with Principal Investigator Lynn McMurdie of the University of Washington, was competitively selected through the Earth Ventures-Science (EV-S) program because of its anticipated breakthrough contributions to NASA Earth Science. It is imperative to resume IMPACTS activities at NASA Centers in order to complete preparations for the planned winter 2021 deployment with NASA's P-3 and ER-2 aircraft along with ground operations. A site survey to secure the ER-2 deployment location is required before integration commences at WFF and AFRC on November 16. Lack of timely access to NASA Centers will delay the winter deployment, reducing the mission's schedule margins and its science return. For more information on IMPACTS see: https://espo.nasa.gov/impacts/content/IMPACTS.*

Since five NASA centers (and 10 universities) are involved, Vidal Salazar (cc'd) will reach out to the points of contact at each center to coordinate the responses for Return to On-site Work (RTOW) plans for instrument and aircraft preparation. Once these are received, I will forward to ESD management for final review. In addition, Lynn McMurdie, Vidal Salazar and the IMPACTS team are developing a COVID-19 operations plan for the January-February 2021 flights and field operations.

Please feel free to contact me, Lynn, and/or Vidal if you have any questions and I urge you to not delay with developing your RTOW plan.

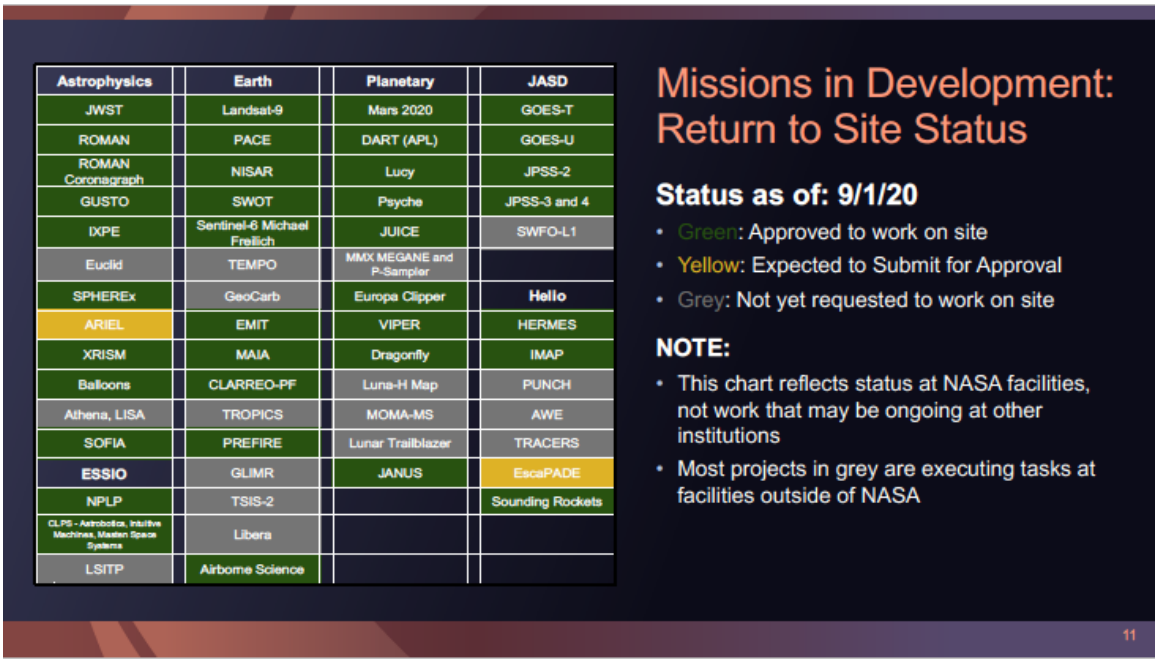
****The current airborne restart process from Karen is that the centers should coordinate with the appropriate counterparts in ESD to reach agreement on whether continued delay of an airborne program constitutes a "major impact" to the research program. If*

they agree, the center should pursue an approach to restart the operations while keeping personnel safe. If they are able to develop such a plan, they send it forward to SMD through Mayra Montrose. In a case where SMD does not believe the safety plan is sufficient they will notify the center. Currently we aren't using the "mission critical" identifier for airborne science. It is the Centers' responsibility to make the determination, as only they can assess whether operations may resume safely.

Thank you,
Gail

Gail Skofronick-Jackson
NASA Headquarters, Earth Science Division
Program Manager, Weather & Atmospheric Dynamics
Program Scientist for GPM, CYGNSS, AQUA/AIRS, IMPACTS
(O) 202-358-2045
(C) 703-517-9935

[2] SMD Approved - Missions in Development: Return to Site Status



Astrophysics	Earth	Planetary	JASD
JWST	Landsat-9	Mars 2020	GOES-T
ROMAN	PACE	DART (APL)	GOES-U
ROMAN Coronagraph	NISAR	Lucy	JPSS-2
GUSTO	SWOT	Psyche	JPSS-3 and 4
IXPE	Sentinel-6 Michael Freilich	JUICE	SWFO-L1
Euclid	TEMPO	MMX MEGANE and P-Sampler	
SPHEREx	GeoCarb	Europa Clipper	Hello
ARIEL	EMIT	VIPER	HERMES
XRISM	MAIA	Dragonfly	IMAP
Balloons	CLARREO-PF	Luna-H Map	PUNCH
Athena, LISA	TROPICS	MOMA-MS	AWE
SOFIA	PREFIRE	Lunar Trailblazer	TRACERS
ESSIO	GLIMR	JANUS	EscaPADE
NPLP	TSIS-2		Sounding Rockets
CLPS - Astrobotic, Intuitive Machines, Maxtan Space Systems	Libera		
LSITP	Airborne Science		

Missions in Development: Return to Site Status

Status as of: 9/1/20

- Green: Approved to work on site
- Yellow: Expected to Submit for Approval
- Grey: Not yet requested to work on site

NOTE:

- This chart reflects status at NASA facilities, not work that may be ongoing at other institutions
- Most projects in grey are executing tasks at facilities outside of NASA

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[3] Email from Carol Carroll stating that now all NASA centers have to review/approve HOW we will do the approved work.

From: Carroll, Carol W. (ARC-D) <carol.w.carroll@nasa.gov>
Sent: Friday, September 11, 2020 9:09 AM
To: Schwandner, Florian M. (ARC-SG) <florian.m.schwandner@nasa.gov>
Cc: Spackman, Ryan (ARC-SG) <ryan.spackman@nasa.gov>; Agnew, Paul R. (ARC-D) <paul.r.agnew@nasa.gov>; Bajpayee, Jaya (ARC-S) <jaya.bajpayee-1@nasa.gov>; Rudisel, Carolina. (ARC-D) <carolina.rudisel@nasa.gov>

Subject: Re: SMD Approved work - Airborne Science

This means that now the Centers have to review/approve HOW we will do the work. So, yes, please prepare and submit your return-to-onsite work plans for the Center to review and Eugene to approve.

From: "Schwandner, Florian M. (ARC-SG)" <florian.m.schwandner@nasa.gov>
Date: Friday, September 11, 2020 at 9:06 AM
To: Carol Carroll <carol.w.carroll@nasa.gov>
Cc: "Spackman, Ryan (ARC-SG)" <ryan.spackman@nasa.gov>, "Agnew, Paul R. (ARC-D)" <paul.r.agnew@nasa.gov>, "Bajpayee, Jaya (ARC-S)" <jaya.bajpayee-1@nasa.gov>, "Rudisel, Carolina. (ARC-D)" <carolina.rudisel@nasa.gov>
Subject: RE: SMD Approved work - Airborne Science

Good morning Carol,

Many thanks for this clarification.
Going forward, I understand this means the next step is that we submit return-to-onsite-work plans for airborne science projects, but not that this "approved" means that we don't need to submit plans?
A brief clarification would be great.

Many thanks for fighting the good fight for us.

Regards,
Florian

From: Rudisel, Carolina. (ARC-D) <carolina.rudisel@nasa.gov>
Sent: Friday, September 11, 2020 9:04 AM
To: Carroll, Carol W. (ARC-D) <carol.w.carroll@nasa.gov>; Agnew, Paul R. (ARC-D) <paul.r.agnew@nasa.gov>; Bajpayee, Jaya (ARC-S) <jaya.bajpayee-1@nasa.gov>
Cc: Schwandner, Florian M. (ARC-SG) <florian.m.schwandner@nasa.gov>; Spackman, Ryan (ARC-SG) <ryan.spackman@nasa.gov>
Subject: RE: SMD Approved work - Airborne Science

Carol,

Thank you, this is helpful!

Carolina Rudisel
Protocol Officer
Office of the Center Director
NASA Ames Research Center
Mail Stop: 200-1A
Moffett Field, CA 94035-1000

Tel: 650-604-2476
Cell: 650-279-2362
Fax: 650-604-6104

E-mail- carolina.rudisel@nasa.gov

From: Carroll, Carol W. (ARC-D) <carol.w.carroll@nasa.gov>
Sent: Friday, September 11, 2020 8:56 AM
To: Rudisel, Carolina. (ARC-D) <carolina.rudisel@nasa.gov>; Agnew, Paul R. (ARC-D) <paul.r.agnew@nasa.gov>; Bajpayee, Jaya (ARC-S) <jaya.bajpayee-1@nasa.gov>
Cc: Schwandner, Florian M. (ARC-SG) <florian.m.schwandner@nasa.gov>; Spackman, Ryan (ARC-SG) <ryan.spackman@nasa.gov>
Subject: SMD Approved work - Airborne Science

I just got the latest from SMD and Airborne Science Missions are in the GREEN as approved for on-site work. Thought I'd send you the whole chart so you have it. We are good to go.

Thanks,
Carol